UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,500	02/17/2004	Byong Mok Oh	2894/108	7866

2101 7590 05/17/2007

BROMBERG & SUNSTEIN LLP
125 SUMMER STREET
BOSTON, MA 02110-1618

EXAMINER
SANTIAGO, ENRIQUE L

ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
05/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/780,500	OH, BYONG MOK	
	Examiner	Art Unit	
	Enrique L. Santiago	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-28 and 32-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-28 and 32-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 4 2007 has been entered.

Response to Arguments

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5-10 and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski et al. US patent no. 6,157,747 in view of Luken US patent no. 5,923,334 and further in view of Katayama et al. US Pub. no. 2002/0081019 A1.

-Regarding claim 1, Szeliski et al. teaches a computerized method for creating a three dimensional model from one or more image panoramas (see column 1, lines 6-11, column 4, lines 8-9 and 66-67): receiving one or more image panoramas representing a visual scene and

having one or more objects (see fig. 6, column 5, lines 51-52); a directional vector indicating an orientation of the visual scene with respect to a reference coordinate system (see fig. 15, column 22, lines 4-9), creating a three dimensional model of the visual scene from the transformed image panoramas using the reference coordinate system and comprising geometry information describing the one or more objects contained in the scene (see column 5, lines 7-35, column 9, lines 4-26), transforming the image panoramas such that the directional vectors are substantially aligned relative to the reference coordinate system (see figs. 11 and 15, column 21, lines 25-59, column 22, lines 2-35), and aligning the transformed image panoramas to each other (see figs. 1 and 2B, column 9, lines 29-36).

Szeliski does not directly teach a method for determining a directional vector for each image panorama. However in similar art Luken teaches said method (see figs. 7-10, 14 and 17, column 12, lines 35-44).

Therefore it would have been obvious to one skilled in the art to combine Szeliski with Luken, because it would provide an efficient system for generating and viewing three-dimensional panoramic images based environment maps, and offer an improved level of interactive graphical feedback (see column 3, lines 5-8).

Szeliski and Luken do not directly teach a method wherein creating a three dimensional model includes identifying a selected object in the transformed and aligned image panoramas and associating geometry information with the selected object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system.

However in similar art Katayama et al. teaches said method (see figs. 1, 3 and 5B, [0082], [0083], [0089]). Therefore it would have been obvious to one skilled in the art at the time of the invention to combine Katayama with Szeliski and Luken, because it would be used to modify objects within the three-dimensional panoramic view (see [0154], [0189], [0350]).

-Regarding claim 2, Szeliski teaches a method wherein the directional vector is determined based, at least in part, on instructions identifying elements of the image panorama received from a user (see column 8, lines 30-32, column 27, lines 64-66).

-Regarding claim 3, Szeliski teaches a method wherein the instructions from the user identify two or more substantially parallel features in the image (see column 20, line 64-column 21, line 6 and lines 25-34).

-Regarding claim 5, Szeliski teaches a method wherein the instructions from the user identifying a horizon line of the image panorama (see fig 4, column 9, lines 54-62).

-Regarding claim 6, Szeliski teaches a method wherein the instructions comprise the identification of two or more areas of the image (see figs. 6 and 18, column 20, lines 49-50, column 27, lines 32-44), each area containing one or more elements and further comprising automatically identifying the two elements contained in the two or more areas (see fig. 6, column 20, lines 49-50, column 32, lines 24-27).

-Regarding claim 7, Szeliski teaches a method further comprising using edge detection to automatically identify two elements (see fig. 32, column 30, lines 13-17).

-Regarding claim 8, Szeliski teaches a method wherein the image panoramas are aligned relative to the reference coordinate system such that the directional vector is at least substantially parallel to one axis of the reference coordinate system (see figs. 11 and 15, column 21, lines 25-59, column 22, lines 2-35 [it is obvious that as the image rotates into alignment the directional vector will be parallel to one axis]).

-Regarding claim 9, Szeliski teaches a method wherein the image panoramas are aligned relative to the reference coordinate system such that the directional vector is at least substantially orthogonal to one axis of the reference coordinate system (see figs. 11 and 15, column 21, lines 25-59, column 22, lines 2-35 [it is obvious that as the image rotates into alignment the directional vector will be orthogonal to one axis]).

-Regarding claim 10, Szeliski teaches a method wherein the image panoramas are aligned according to instructions received from a user (see column 8, lines 30-32, column 25, lines 64-66, column 27, lines 64-66).

-Regarding claim 32, Szeliski et al. teaches a system for creating a three dimensional model from one or more image panoramas (see fig. 2B, column 4, lines 66-67, column 9, lines 4-26) comprising: means for receiving one or more image panoramas representing a visual scene having one or more objects (see column 4, lines 8-13 [captured = received images] and 66-67); means for allowing a user to interact with the system (see column 8, lines 30-32, column 25, lines 64-66, column 27, lines 64-66); means for aligning the image panoramas relative to each other (see figs. 1, 2B, 11 and 15, column 9, lines 29-36, column 21, lines 25-59, column 22, lines 2-35); and means for creating a three dimensional model from the aligned panoramas (see figs. 1

and 2B, column 9, lines 29-36), the model comprising geometry information describing the one or more objects contained in the scene (see column 5, lines 7-35, column 9, lines 4-26)

Szeliski does not directly teach a method for determining a directional vector for each image panorama. However in similar art Luken teaches said method (see figs. 7-10, 14 and 17, column 12, lines 35-44).

Therefore it would have been obvious to one skilled in the art to combine Szeliski with Luken, because it would provide an efficient system for generating and viewing three-dimensional panoramic images based environment maps, and offer an improved level of interactive graphical feedback (see column 3, lines 5-8).

-Regarding claim 33, Szeliski teaches a system wherein the input images comprise two-dimensional images (see figs. 1 and 2B, [$I_{(0-k)}$ are two dimensional]).

-Regarding claim 34, Szeliski teaches a system wherein the input images comprise three-dimensional images including geometry information (see fig. 2B, column 5, lines 7-35, column 9, lines 4-26).

Regarding claim 35, Szeliski teaches a system wherein the image panoramas are aligned according to instructions received from a user (see figs. 1 and 2B, column 8, lines 30-32, column 25, lines 64-66, column 27, lines 64-66).

Claims 11, 12, 22-28 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski et al. US patent no. 6,157,747 in view of Katayama et al. US Pub. no. 2002/0081019 A1.

-Regarding claim 11, Szeliski et al. teaches a computerized method of interactively editing objects in a panoramic image (see column 1, lines 6-11, column 4, lines 8-9 and 66-67, column 8, lines 30-32, column 27, lines 64-66) comprising: receiving an image panorama representing a visual scene (see fig. 3, column 5, lines 46-47, column 9, lines 55-62), the image panorama having one or more objects and a point source (see figs. 3, 4 and 6, column 5, lines 46-52); creating a three dimensional model of the visual scene using features of the visual scene and the point source (see fig. 2B, column 4, lines 66-67, column 9, lines 4-26); receiving an edit to one or more of the objects in the panorama (see fig. 1, column 7, lines 11-20); transforming the edit relative to a viewpoint defined by the point source (see column 10, lines 27-38, column 11, lines10-21); and projecting the transformed edit onto the objects (see figs 2B-8, column 3, lines 58-61, column 31, lines 44-51).

Szeliski does not directly teach a method wherein creating a three dimensional model includes identifying a selected object in the image panorama and associating geometry information with the selected object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system.

However in similar art Katayama et al. teaches said method (see figs. 1, 3 and 5B, [0082], [0083], [0089]). Therefore it would have been obvious to one skilled in the art at the time of the invention to combine Katayama with Szeliski and Luken, because it would be used to modify objects within the three-dimensional panoramic view (see [0154], [0189], [0350]).

-Regarding claim 12, Szeliski teaches a three-dimensional model (see figs. 2B, 27, 30 and 32, column 28, lines 29-31, column 29, lines 58-61), three-dimensional models inherently contain one or more of depth information and geometry information.

-Regarding claim 22, Szeliski et al. teaches a method for projecting texture information onto a geometric feature within an image panorama (see fig. 2B, column 3, lines 58-61, column 27, lines 34-55) comprising: receiving instructions from a user identifying a three-dimensional geometric surface within an image panorama (see column 7, lines 10-20), the image panorama containing features having one or more textures (see column 5, lines 27-35); determining a directional vector from the three-dimensional geometric surface (see figs. 2B and 15, column 22, lines 4-31); creating a geometric model of the image panorama based at least in part on the three-dimensional geometric surface and the directional vector (see figs. 2A-B, column 7, lines 25-33, column 9, lines 4-26, column 22, lines 4-31); and applying the one or more textures to the features in the image panorama based on the geometric model (see fig. 2B, column 9, lines 29-31, column 32, lines 22-29 and 41-43).

Szeliski does not directly teach a method wherein creating a three dimensional model includes associating geometry information with the selected feature, the geometry information comprising 3-D coordinates describing the position and orientation of the selected feature in the reference coordinate system.

However in similar art Katayama et al. teaches said method (see figs. 1, 3 and 5B, [0082], [0083], [0089]). Therefore it would have been obvious to one skilled in the art at the time of the

invention to combine Katayama with Szeliski and Luken, because it would be used to modify objects within the three-dimensional panoramic view (see [0154], [0189], [0350]).

-Regarding claim 23, Szeliski teaches a method wherein the instructions are received using an interactive drawing tool (see column 27, line 64-colum 28, line 2).

-Regarding claim 24, Szeliski teaches a method wherein the three-dimensional geometric surface is one of a floor, a wall, or a ceiling (see figs. 33 and 38, column 30, lines 44-45).

-Regarding claim 25, Szeliski teaches a method wherein the directional vector is orthogonal to the planar surface (see fig. 15, column 15, lines 64-66, column 22, lines 4-6).

Regarding claim 26, Szeliski teaches a method wherein the geometric model comprises depth information (see figs. 2B, 27 and 30, column 28, lines 29-33).

-Regarding claim 27, Szeliski teaches a method wherein the texture information comprises color information (see column 28, lines 13-18).

-Regarding claim 28, Szeliski teaches a method comprising environment based texture mapping (see fig. 2B, column 5, lines 27-30, column 9, lines 12-26), in said method the texture information inherently includes luminance information (see figs. 33-38).

-Regarding claim 36, Szeliski et al. teaches a system for interactively editing objects in a panoramic image (see column 1, lines 6-11, column 4, lines 8-9 and 66-67, column 8, lines 30-32, column 27, lines 64-66) comprising: a receiver for receiving one or more image panoramas representing a visual scene (see fig. 3, column 5, lines 46-47, column 9, lines 55-62) having one or more objects and a point source (see figs. 3, 4 and 6, column 5, lines 46-52); a modeling

module for creating a three dimensional model of the visual scene (see figs. 2B, 27, 30 and 32, column 4, lines 66-67, column 9, lines 4-26, column 28, lines 29-31, column 29, lines 58-61) including depth information describing the objects (three-dimensional models inherently contain depth information), one or more interactive editing tools for providing an edit to one or more objects in the panorama (see fig. 1, column 7, lines 11-20, column 8, lines 30-32); a transformation module for transforming the edit relative to a viewpoint defined by the point source (see figs. 2B and 8, column 10, lines 27-38, column 11, lines10-21); and a rendering module for projecting the transformed edit onto the objects (see figs. 1 and 2A-B, column 3, lines 58-61, column 31, lines 44-51).

Szeliski does not directly teach a method wherein creating a three dimensional model includes identifying a selected object in the image panorama and associating geometry information with the selected object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system.

However in similar art Katayama et al. teaches said method (see figs. 1, 3 and 5B, [0082], [0083], [0089]). Therefore it would have been obvious to one skilled in the art at the time of the invention to combine Katayama with Szeliski and Luken, because it would be used to modify objects within the three-dimensional panoramic view (see [0154], [0189], [0350]).

Claims 13-21 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski et al. US patent no. 6,157,747 view of Katayama et al. US Pub. no. 2002/0081019 A1 and further in view of Blank US patent no. 5,469,536.13.

-Regarding claim 13, Szeliski and Katayama do not directly teach a method comprising receiving an edit to color information associated with the objects of the image. However in similar art Blank teaches said method (see column 6, lines 29-47). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 14, Szeliski and Katayama do not directly teach a method comprising receiving an edit to alpha information associated with the objects of the image. However in similar art Blank teaches said method (see fig. 11, column 20, lines 61-66). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 15, Szeliski and Katayama do not directly teach a method comprising receiving an edit to depth information associated with the objects of the image. However in similar art Blank teaches said method (see column 3, lines 59-67, column 13, lines 8-16). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 16, Szeliski and Katayama do not directly teach a method comprising receiving an edit to geometry information associated with the objects of the image. However in similar art Blank teaches said method (see column 47, lines 11-20). Therefore it would have been

obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 17, Szeliski and Katayama do not directly teach a method comprising: providing a user with an interactive drawing tool that specifies edits for one or more objects of the image; and receiving the edits made by the user using the interactive drawing tool. However in similar art Blank teaches said method (see column 21, lines 18-23, column 28, lines 28-35). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claims 18 and 37, Szeliski and Katayama do not directly teach a method wherein the interactive drawing tool (editing tool) is one of an extrusion tool, a ground plane tool, a depth chisel tool or a non-uniform rational B-spline tool. However in similar art Blank teaches said method (see column 8, lines 46-52, column 34, lines 22-27). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 19, Szeliski and Katayama do not directly teach a method wherein the interactive drawing tool specifies a selected value for depth for objects of the image. However in similar art Blank teaches said method (see column 21, lines 14-27, column 22, lines 35-62). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama

with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28).

-Regarding claim 20, Szeliski and Katayama do not directly teach a method wherein the interactive drawing tool incrementally adds to the depth for objects of the image. However in similar art Blank teaches said method (see column 34, lines 8-11). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28, column 48, lines 26-39).

-Regarding claim 21, Szeliski and Katayama do not directly teach a method wherein the interactive drawing tool incrementally subtracts from the depth for objects of the image. However in similar art Blank teaches said method (see column 34, lines 22-26). Therefore it would have been obvious to one skilled in the art to combine Szeliski and Katayama with Blank, because it would enable the user to quickly and efficiently modify or enhance the appearance of an image to desired goal (see column 6, lines 23-28, column 48, lines 26-39).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Enrique L Santiago whose telephone number is (571) 272-7648. The examiner can normally be reached on Monday to Thursday from 6:30 A.M. to 4:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark K. Zimmerman whose telephone number is (571) 272-7653, can be reached on Monday to Friday from 7:00 A.M. to 3:30 P.M.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Faxed to: 571-273-8300

Hand carried deliveries must be made to the Customer Service Window (now located at the Randolph Building, 401 Dulany Street, Alexandria, VA 22314).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Enrique L. Santiago

May 14, 2007

Mark Zimmerman

MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600